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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/541,691	04/13/2006	Georg Bostanjoglo	2002P17431WOUS	1935
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John P. Musone Siemens Corporation Intellectual Property Department 170 Wood Avenue South Iselin, NJ 08830			EXAMINER MALEKZADEH, SEYED MASOUD	
			ART UNIT 1791	PAPER NUMBER
			MAIL DATE 12/23/2008	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/541,691

**Applicant(s)**

BOSTANJOGLO ET AL.

**Examiner**

SEYED M. MALEKZADEH

**Art Unit**

1791

**Period for Reply** -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 09 October 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 11-16 and 18-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 11-16 and 18-26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/S508)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/09/2008 has been entered.

### ***Response to Amendment***

Claims 11-16 and 18-26 are pending.

Claims 1-10 and 17 are cancelled.

In view of the amendment, filed on 10/09/2008, following rejections are withdrawn from the previous office action for the reason of record.

- Rejection of claims 11-15, 18-21, and 25 under 35 U.S.C. 103(a) as being unpatentable over Kurz et al (US 6,024,792) in view of Kear et al (US 4,250,229)
- Rejection of claims 16 and 26 under 35 U.S.C. 103(a) as being unpatentable over Kurz et al. ('792) and Kear et al. ('229), and further in view of Caballero (US 5,213,907)

- Rejection of claims 22-24 under 35 U.S.C. 103(a) as being unpatentable over Esch et al. (US 6,331,361) in view of Kear et al. (US 4,250,229)

**New Grounds of Rejection**

***Claim Rejections - 35 USC § 112, 2<sup>nd</sup> Paragraph***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 12-13, 19, and 21-24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 12 recites the limitation "the structure" in the second line. There is insufficient antecedent basis for this limitation in the claim because the recitation fail to clearly define is referring to which of the recitations of "single-crystal structure", "structure defect" or "directional structure" which are cited in claim 11.

Claim 13 recites the limitation "the epitaxial growth" in the second line of the claim. There is insufficient antecedent basis for this limitation in the claim because prior to the cited limitation, the claim fails to clearly defines "an epitaxial growth step" for the claimed process.

Claim 19 recites the limitation "a second material application process" in the second line of the claim. There is insufficient antecedent basis for this limitation in the claim because prior to the cited limitation, the claim fails to clearly define "a first material application process".

The recitation "the intermediate layer at least approximately corresponds to the material composition of the substrate" in claim 21 is a relative term which renders the claim indefinite. The term "approximately" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

Claim 21 recites the limitation "the material composition of the substrate" in the second and third lines of the claim. There is insufficient antecedent basis for this limitation in the claim because prior to the cited limitation, the claimed subject matter fails to clearly teach "a material composition of the substrate".

The recitation "partially single crystal structure" in claim 22 is a relative term which renders the claim indefinite. The term "partially" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

The term "at least approximately corresponds" in claim 23 is a relative term which renders the claim indefinite. The term "approximately" is not

defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

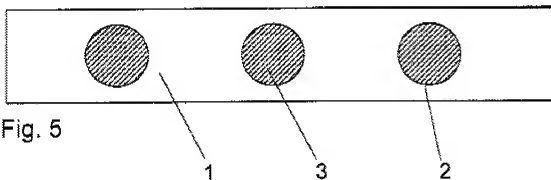
(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 22-24 are rejected under 35 U.S.C. 102(a and e) as being anticipated by Konter et al. (US 6,405,435)

Konter et al. (US '435) teaches a finished gas turbine component comprising a substrate (1) with a single crystal structure including a plurality of profiles (2), a thermally stable filling material layer (3) as an intermediate layer over the profiles (2) of the substrate (1), and a mono-crystalline layer (6) as a third layer material formed over the substrate (1) and the intermediate layer (3), wherein the intermediate layer is made of ceramic material based on

$Al_2O_3$  and/ or  $SiO_2$  and/ or  $ZrO_2$  and therefore, it does not include a single crystal or directional structure, and also the intermediate layer is applied via a different production step than production step of the substrate (1) or single crystal build up layer (6). (See column 3, lines 14-20 and lines 61-67) Therefore, the prior art teaches a substrate (1) having a single crystal structure, an intermediate layer (3) having no single crystal or directional structure applied to the substrate (1) and a third layer (6) with a single crystal structure formed on the intermediate layer (3). (See figure 5). Furthermore, Konter et al. (US '435) disclose the composition of the layer material (6) corresponds to the material composition of the substrate (1).



In respect to the recitation of claim 24 that "the intermediate is generated electrochemically", the limitation is directed to the process of forming a product component, and a process step of forming a product or apparatus component is treated as intended use.

Intended use has been continuously held not to be germane to determining the patentability of the apparatus, *In re Finsterwalder*, 168 USPQ 530.

The manner or method in which a machine is to be utilized is not germane to the issue of patentability of the machine itself, *In re Casey*, 152 USPQ 235,238.

Purpose to which apparatus is to be put and expression relating apparatus to contents thereof during intended operation are not significant in determining patentability of an apparatus claim, *Ex parte Thibault*, 164 USPQ 666.

A recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations, *EX parte Masham*, 2 USPQ2d 1647.

The prior art, thus, meets all the claim limitations, and therefore, Konter et al. (US '435) anticipates the claims 22-24.



***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 11-13, 18-21, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Konter et al. (US 6,405,435) in view of Terkelsen (US 4,289,570)

Konter et al. (US '435) teach a method for producing or repairing cooling channels in mono-crystalline gas turbine components comprising the steps of casting a mono-crystalline gas turbine component as a manufacturing step for providing a substrate (1) having a single crystal structure in which the substrate (1) includes a plurality of profiles (2) created during casting, applying a thermally stable filling material layer (3) as an intermediate layer over the

profiles (2) of the substrate (1), creating a mono-crystalline layer (6), epitactically, above the thermally stable filling material layer (3) as a step of epitaxially growing a single crystal buildup layer (6) material on the intermediate layer (3) in which the single crystal build up layer (6) is at least partially isolated from the substrate (1) by the intermediate layer (3) wherein the intermediate layer is made of ceramic material based on  $Al_2O_3$  and/ or  $SiO_2$  and/ or  $ZrO_2$ ; therefore, the intermediate layer does not include a single crystal or directional structure, and also the intermediate layer is applied via a different production step than production step of the substrate (1) or single crystal build up layer (6). (See column 4, lines 61-67, and column 5, lines 1-5; also see lines 14-20, column 3)

Moreover, the prior art teaches the substrate (1) comprises a turbine blade, and further, the material composition of the intermediate layer (3) corresponds to the material composition of the substrate (1), and a composition ratio of constituents for the intermediate layer (3) is compatible with a main composition ratio of main constituents of the substrate (1).

Also, the intermediate layer separate the intermediate layer with the epitaxially grown over-layers, and since the intermediate layer include a different structure with the substrate, any structure characteristics of the substrate is not copied into the intermediate layer.

However, the prior art is silent about any structure defect of the surface substrate, as claimed in claims 11 and 25, and also the prior art fails to teach

the intermediate layer include a directional micro-structure, as claimed in claim 18.

In the analogous art, Terkelsen (US '570) teaches a method of directionally solidifying a metal melt into an article with controlled crystallographic orientation using a seed as a substrate and growing epitaxial layers on the seed through epitaxial growth comprising the steps of altering the composition of at least a portion of the seed using an element which lowers the melting point and which promotes dissolution in the melt of undesirable surface compounds where the seed is adapted to contact the melt, providing a mold to contain the seed and to receive the melt, pouring molten metal into the mold to contact the seed and thereby melt the surface portion of the seed where its composition is altered, and directionally solidifying the melt to promote epitaxial growth from the seed. (See column 4, lines 64-68 and column 5, lines 1-7)

Further, Terkelsen (US '570) teaches adding elements such as boron to the substrate has the advantageous effect of producing a fluxing action on any oxide or other contamination layers as intermediate layers which are formed on the seed surface, (see lines 43-46, column 3) separate from the epitaxial layers and also having a directional structure.

Also, Terkelsen (US '570) discloses the provision of a surface composition which enhances the dissolution, in the molten metal of the alloy being cast, of undesirable surface compounds which interfere with epitaxy, (See column 1,

lines 63-67) and further, the entire seed has a composition with either the depressed melting point or surface film dissolving characteristics. It is, of course, required that the seed have a crystallographic structure and nature from which epitaxial solidification of the melt can take place, and this would prevent the use of seeds of grossly dissimilar nature. (See lines 26-32, column 4)

Therefore, the prior art teaches a structure defect at a surface of the substrate in which the single crystal buildup layer being isolated from the structural defect of the substrate by the intermediate layer wherein the structure defect at the surface of the substrate is not copied into the intermediate layer.

Therefore, it would be obvious for one of ordinary skill in the art at the time of applicant's invention to modify the process steps as taught by Konter et al. (US 6,405,435) through providing a structure defect on the surface substrate and growing the intermediate layer with a directional microstructure, as suggested by Terkelsen (US '570) in order to produce a structurally uniform finished single crystal product with high quality and applicable properties and characteristics.

Claims 14-15 rejected under 35 U.S.C. 103(a) as being unpatentable over Konter et al. (US 6,405,435) in view of Terkelsen (US 4,289,570), as applied to

claims 11-13, 18-21, and 25, and further in view of Schnell et al. (US 2003/0066177)

Combined teachings of Konter et al. (US '435) and Terkelsen (US '570) teach all the structural limitations of a process for producing single-crystal structure from metallic super-alloys, as claimed in claims 11-13, 18-21, and 25; however, the prior arts fail to teach a heat treatment step in which transforms at least part of the intermediate layer with the substrate into a region having a crystalline structure.

In the analogous art, Schnell et al. (US 2003/0066177) teach a method of joining or repairing cracks or gaps in a single crystal article made of a Nickel based super alloys by means of isothermal, epitaxial single crystal solidification of a brazing alloy wherein the brazing alloy comprising  $\gamma'$ -phase forming elements and at least boron as melting point depressant and base material comprises Nickel and other additives (see claims 1 and 2) in which the process include a step of heat treatment of the isothermal solidification at a temperature of 1120°C - 1160°C for 8 to 20 hours, preferably, at a temperature of 1140°C for reasons of in-situ adjusting of the micro-structure of the brazed joint; also, there can be a heat treatment of 1180°C for 30 minutes after the heat treatment. Therefore, the prior art provides a heat treatment step in which transforms at least part of the intermediate layer with the substrate into a region having a crystalline structure. (See paragraphs [0012] and [0013])

Therefore, it would have been obvious for one of ordinary skill in the art at the time of applicant's invention to modify the process steps as taught by combined teachings of Konter et al. (US '435) and Terkelsen (US '570) through providing a heat treatment step in which the step transforms at least part of the intermediate layer with the substrate into a region having a crystalline structure, as suggested by Schnell et al. (US '177) in order to maximize the strength of the brazed joints of the single crystal components.

Claims 16 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Konter et al. (US 6,405,435) in view of Terkelsen (US 4,289,570) as applied to claims 11-13, 18-21, and 25 above, and further in view of Caballero (US 5,213,907)

Combined teaching of Konter et al. (US 435) in view of Terkelsen (US 570) disclose all the process limitations of a process for producing single-crystal structure from metallic super-alloys as discussed above; however, fail to teach the intermediate layer is generated by an electrochemical process, as claimed in claim 16, or by an electro-deposition process, as claimed in claim 26.

In the analogous art, Caballero et al. ('907) discloses epitaxial deposition of a metal alloy such as Ni-B, Co-B, Ni-Co, Ni-Fe, Co-Fe, Ni-Co-Fe which are comparable with intermediate layer by an electrochemical process on a surface of a substrate. (See lines 14-23, column 2)

Also, Caballero ('907) teaches a method of electrodepositing metal alloys which causes the alloy to diffuse into the surface of a substrate and chemically bond to the substrate at the interface between the alloy and the substrate (See lines 28-34, column 2). Furthermore, Caballero ('907) teaches the metal alloy, which is deposited by the electrodepositing method is dense, hard, ductile and highly reflective (See lines 21-25, column 2)

Also, Caballero et al. ('907) teach the advantages of employing an electro-chemical or electro-deposition process for the layer's deposition in order to improve the complexity of the deposition process in which the layers can be deposited quickly and easily. (See lines 37-41, column 2)

It would have been obvious to one of ordinary skill in the art at the time the applicants' invention was made to modify the combined teachings of Konter et al. (US 435) in view of Terkelsen (US 570) through generating an intermediate layer by an electro-chemical or electro-deposition process in order to apply deposition process of intermediate layer quicker and easier, as suggested by Caballero ('907).

### ***Response to Arguments***

Applicant's arguments with respect to claims 11-16 and 18-26 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Seyed Masoud Malekzadeh whose telephone number is 571-272-6215. The examiner can normally be reached on Monday – Friday at 8:30 am – 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven P. Griffin, can be reached on (571) 272-1189. The fax number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published application may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



/S. M. M./

/SEYED MASOUD MALEKZADEH/

Examiner, Art Unit 1791

/Eric Hug/

Primary Examiner, Art Unit 1791